PATENT SPECIFICATION

DRAWINGS ATTACHED

892,655

Date of Application and filing Complete Specification: April 3, 1960.

No. 13165/60.

Application made in Germany on April 23, 1959.

Complete Specification Published: March 28, 1962.

Index at acceptance:—Classes 60, D(1A: 2A15); and 8(2), A2BX.

International Classification:—B24b. F24f.

COMPLETE SPECIFICATION

Portable Grinding Machine

We, ERWIN MURSCHEL and KARL MESCHER, both German citizens, trading as C. F. SCHEER & CIE, of Greutterwaldstrasse 23, Stuttgart-Weilimdorf, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to improvements in portable grinding machines in which the abrading member consists of an endless flexible belt. It will be readily understood however, that the machine may also be utilised for sanding or polishing by using an appropriate belt, and the term "grinding" is to be read as including sanding and polishing.

An important object of the present invention is to provide a portable grinding machine with a low centre of gravity which insures better guidance of the machine along a workpiece without it being necessary that the machine be equipped with a special guide frame such as is utilised in certain types of known portable grinding, sanding, polishing and like machines.

Another important object of the invention is to provide a portable grinding machine wherein the endless abrading belt is mounted on large-diameter pulleys whereby the abrading belt need not be subjected to excessive tension such as would reduce its useful life.

A further object of the invention is to provide a grinding machine in which the endless abrading belt is not subjected to excessive deflections about small-diameter guiding and driving members such as would contribute to greater wear of the endless abrading belt and would render it necessary to use high-quality and hence more expensive abrading belts.

A concomitant object of the invention is to provide a grinding machine which may be utilised as a portable machine as well as a stationary machine, which is constructed and assembled in a way to afford convenient access to its component parts, and which is adapted not only to collect the matter abraded from a workpiece but to simultaneously cool the driving motor which moves the endless abrading belt.

With the above objects in view, there is provided, according to the present invention, a portable grinding machine comprising a machine frame having a pulley mounted at both the front and rear ends thereof over which an endless abrading belt is trained one of said pulleys being driven by an electric motor which drives also two fans one of which serves to cool the motor and the other serving to exhaust dust from the machine, the electric motor being located between the pulleys and being carried by a backing plate of the frame which serves also to support a housing in which the fans are located said fans being driven directly by the motor shaft. The diameters of the pulleys and the dimensions of the motor housing are selected in such a way that the upper run of the endless abrading belt i.e. that run of the belt which is not backed by a grinding shoe, may extend in a straight line from the guiding pulley to the driving pulley so that the said run of the belt is not deflected by the motor housing. Owing to such construction, the centre of gravity of the improved machine is extremely low which insures better guidance along the surface of a workpiece. In addition, the machine is of very simple construction since it requires only two pulleys for properly guiding and advancing the endless abrading belt. The exact position of the centre of gravity is determined by the position of the motor whose shaft is preferably parallel with the pulley shafts and is preferably located in or close to the common plane of said pulley shafts. Such arrangement is of considerable advantage because it simplifies the driving connection between the motor shaft and the shaft of the driving wheel. Of course, the diameters of both pulleys need not be the same, and the motor shaft need not necessarily be parallel with the pulley shafts.

The grinding shoe is preferably mounted

[Price 4s. 6d.]

directly on [redacted] extends downwardly from the lower portion of the motor housing. Such construction allows for further reduction in the dimensions of the grinding machine.

Since the upper run of the endless abrading belt does not require additional guiding or deflecting rollers, the upper wall of the machine frame may be formed with a plane upper side or surface so that the machine may be turned upside down and placed on a solid support to serve as a stationary grinding machine.

The invention will now be described with reference to the accompanying drawings, which illustrate a preferred embodiment thereof and in which:—

Fig. 1 is a perspective view of a portable grinding machine embodying the invention;

Fig. 2 is an enlarged scale elevational view of the grinding machine; and

Fig. 3 is a section taken substantially along the line III—III of Fig. 2, as seen in the direction of arrows.

Referring now in greater detail to the illustrated embodiment, the portable grinding machine comprises a frame 10 including a side wall 11, an end wall 12 and an upper wall 13, having a plane surface 14 which may be used as a supporting surface when the machine is turned upside down, the surface 14 then resting on a supporting plate or the like. The end wall 12 is connected to or is integrally formed with a handle 15 supporting an internal switch 16 which latter is utilised for starting or arresting the electric driving motor 18. The motor comprises a housing 19 which, as best shewn in Fig. 3, may be integral with the side wall 11 of the machine frame 10. The motor comprises two carbon brushes 20, 21 which are located in an inclined plane a—a indicated in Fig. 2.

The driving shaft 23 of the motor 18 carries a spur gear 24 which meshes with an intermediate gear 26 rotatably mounted in the side wall 11, the gear 26 meshing with a driven spur gear 27 on the shaft 28 of a driving pulley 30. The shaft 28 extends through and is journaled in the side wall 11. At the opposing side of the motor housing 19, the side wall 11 rotatably supports the shaft 33 of a belt tensioning and guiding pulley 32. A schematically indicated tensioning assembly 35 comprises resilient means (not shewn) which constantly biases the shaft 33 in a direction away from the shaft 28, i.e. the tensioning pulley 32 is constantly biased in a direction away from the motor housing 19 whereby the endless abrading belt 36 which is mounted for travel about the pulleys 30, 32, remains under requisite tension. It will be readily understood that the belt tensioning assembly 35 may be provided at another point of the machine; for example, such modified tensioning assembly may comprise a spring-biased roll which engages with the upper run 60 or with the lower run 63 [redacted]e abrasive belt 36. In such event, the pulley 32 merely guides the belt 36 in its travel along the upper and lower sides of the motor housing 19. Alternatively, the grinding shoe 38 which is illustrated as integral with and extending from the lower portion of the motor housing 19, and which bears against the lower run 63 of the belt 36, may be resiliently mounted on the motor housing 19 and the tensioning assembly 35 omitted.

The exposed outer side of the side wall 11 supports two fan or ventilator casings 40, 41 as well as a partition 42 which separates the casing 40 from the casing 41. The interior of the casing 41 communicates with a discharge pipe 43 which removably supports a dust collecting bag 45. This pipe 43 may constitute a second handle which is grasped by an operator who desires to transfer the machine to another location. As is clearly shown in Fig. 2, all rigid components of the grinding machine are mounted below the level of the upper wall 13 whereby the machine may be turned upside down and the exposed upper side 14 of wall 13 placed onto a solid support. In such position, the machine may be utilised as a stationary grinder.

The motor shaft 23 is directly connected with two coaxial fans 48, 49 which are rotatable in the fan casings 40, 41, respectively. The fan 48 is utilised for drawing cooling air through the intake apertures 50 in the front wall of the motor housing 19, the cooling air passing through said housing and being discharged through the discharge aperture 52 in the fan casing 40. The second fan 49 is utilised for withdrawing abraded matter, i.e. dust particles, from the space or compartment partially enclosed by walls 11, 12 rearwardly of the shoe 38 and driving pulley 30. In order to improve the dust collecting action of the fan member 49, there is provided a scraper or wiper 54 which is adjustably fixed to the lower edge of the end wall 12 by a series of screws 53. The free lower edge of the wiper 54 is located in the plane of the underside 55 of the shoe 38 and more particularly in the plane of that zone of the abrasive belt 36 which passes beneath the shoe 38. The abraded matter is withdrawn through a cutout 58 formed in the side wall 11 which communicates with the interior of fan casing 41 whence the dust particles travel through the discharge pipe 43 and into the bag 45. The driving pulley 30 rotates in clockwise direction so that the lower run 63 automatically advances matter removed from a workpiece W in a direction toward the cutout 58.

It will be seen that the upper run 60 of the flexible belt 36 is free to pass tangentially from the driving pulley 30 and in a straight path directly to the guiding pulley 32, and that the lower run 63 is free to pass from the idler pulley 32 beneath the underside 55 of the shoe 38 and directly to the driving pulley 30,

the motor housing 19 being received in the space formed between runs 60, 63 and pulleys 30, 32. As is shewn in Fig. 2, there is a small clearance *b* between the upper run 60 and the upper side of the motor housing 19. The shoe 38 projects downwardly and beyond the tangential plane common to the pulleys 30, 32 so that the shoe 38 deflects the lower run 63 in downward direction, the belt passing along the underside 55 of the member 38. In other words, the portions of the lower run 63 which extend between the pulleys 30, 32 and the underside 55 of the shoe 38 are inclined with respect to that zone which travels beneath the member 38. The inclination of such belt portions may be varied by utilising pulleys of different diameters. It is preferred to mount the shoe 38 in such manner that it extends only slightly beyond the common lower tangential plane of pulleys 30, 32 because such arrangement lowers the centre of gravity of the machine.

Fig. 1 shews a window 65 in the upper wall 13 of the machine frame 10. This window is preferably closed by a removable transparent pane *65a* which permits observation of the abrasive belt 36. It is preferred to provide the window at such a point that the window permits simultaneous observation and, upon removal of pane *65a*, necessary adjustments in the position of the brush 20. As stated before, the brushes 20, 21 are located in the inclined plane a—a which is shewn in Fig. 2. Adjustments of the lower brush 21 are made possible by the provision of a second window (not shewn) in the grinding shoe 38.

It will be noted that the axes of pulleys 30, 32 and the axis of the motor 18 are located in a common plane and are parallel with each other. The diameters of and the distance between the pulleys 30, 32 should be selected in such a way that the motor housing 19 can be readily accommodated in the space between the runs 60, 63 of the abrasive belt 36.

It is also possible to omit the partition 42 between the fan casings 40, 41 if the fans are constructed and mounted in such a way that the air currents do not interfere with each other.

WHAT WE CLAIM IS:—

1. A portable grinding machine comprising a machine frame having a pulley mounted at both the front and rear ends thereof over which an endless abrading belt is trained one of said pulleys being driven by an electric motor which drives also two fans one of which serves to cool the motor and the other serving to exhaust dust from the machine the electric motor being located between the pulleys and being carried by a backing plate of the frame which serves also to support a housing in which the fans are located said fans being driven directly by the motor shaft.

2. A portable grinding machine as claimed in claim 1, wherein the motor drives one of the pulleys through gear wheels which are located in a space between the backing plate and the fan housing.

3. A portable grinding machine according to claim 1, wherein the machine frame has a substantially flat top wall beneath which all the operating parts of the machine are located.

4. A portable grinding machine according to claim 1, wherein a handle is provided on an end wall of the machine frame said handle supporting an electric switch for controlling the motor.

5. A portable grinding machine according to claim 1, wherein the housing has an exhaust branch which can be utilised as a carrying handle.

6. A portable grinding machine according to claim 1, wherein a grinding shoe is resiliently mounted on a housing containing the electric motor.

7. A portable grinding machine having its parts constructed and arranged substantially as hereinbefore described with reference to the accompanying drawings.

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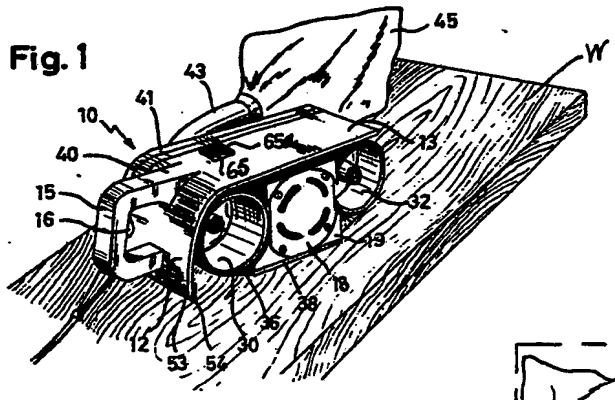
Leamington Spa: Printed for Her Majesty's Stationery Office, by the Courier Press.—1962.
Published by The Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies may be obtained.

892655 COMPLETE SPECIFICATION
1 SHEET This drawing is a reproduction of the Original on a reduced scale

Fig. 1



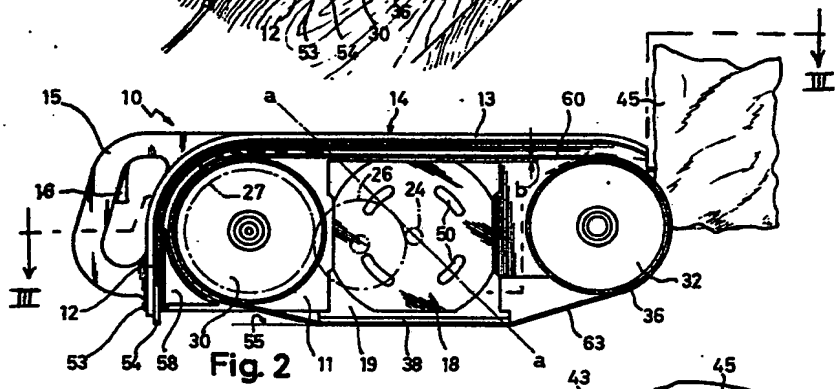


Fig. 2

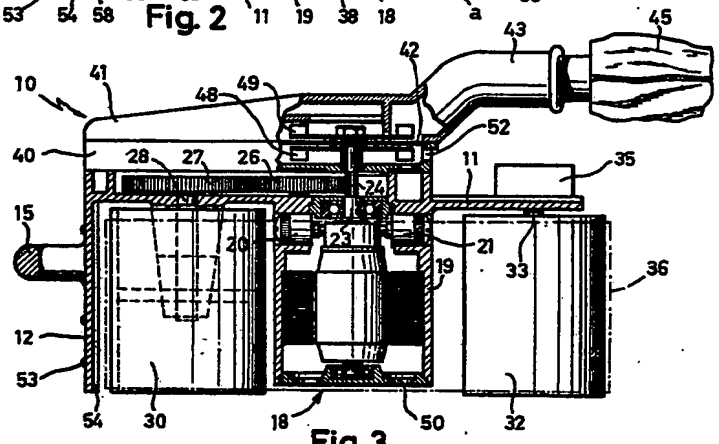


Fig. 3